CORNELL UNIVERSITY ANNOUNCEMENTS

NUTRITION 1961-1963

GRADUATE SCHOOL OF NUTRITION

ACADEMIC CALENDAR (Tentative)

1961–1962			1962–1963	
Sept. 16	S	Freshman Orientation	Sept. 15	S
Sept. 18	M	Registration, new students	Sept. 17	M
Sept. 19	T	Registration, old students	Sept. 18	T
Sept. 20	W	Instruction begins, 1 p.m.	Sept. 19	W
Nov. 8	W	Midterm grades due	Nov. 7	W
		Thanksgiving recess:		
Nov. 22	W	Instruction suspended, 12:50 p.m.	Nov. 21	W
Nov. 27	M	Instruction resumed, 8 a.m.	Nov. 26	M
		Christmas recess:		
Dec. 23	S	Instruction suspended, 12:50 p.m.	Dec. 22	S
Jan. 8	M	Instruction resumed, 8 a.m.	Jan. 7	M
Jan. 20	S	First-term instruction ends	Jan. 19	S
Jan. 22	M	Second-term registration, old students	Jan. 21	M
Jan. 23	T	Examinations begin	Jan. 22	T
Jan. 31	W	Examinations end	Jan. 30	W
Feb. 1–2,	Th-F	Midyear recess	Jan. 31-Feb. 1	Th-F
Feb. 3	S	Registration, new students	Feb. 2	S
Feb. 5	M	Second-term instruction begins	Feb. 4	M
Mar. 24	S	Midterm grades due	Mar. 23	S
		Spring recess:		
Mar. 24	S	Instruction suspended, 12:50 p.m.	Mar. 23	S
Apr. 2	M	Instruction resumed, 8 a.m.	Apr. 1	M
May 26	S	Instruction ends	May 25	S
May 28	M	Examinations begin	May 27	M
June 5	T	Examinations end	June 4	T
June 11	M	Commencement Day	June 10	M

GRADUATE SCHOOL OF NUTRITION

1961-1962 and 1962-1963

The Graduate School of Nutrition, a unit of Cornell University, is supported in part by state appropriations through the State University of New York

CORNELL UNIVERSITY ANNOUNCEMENTS

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SANFORD S. ATWOOD, Ph.D., Provost of the University
RICHARD H. BARNES, Ph.D., Dean of the School
CHARLOTTE M. YOUNG, Ph.D., Secretary of the School

TEACHING AND RESEARCH

In this list the titles and departments of primary affiliation of faculty members are indicated.

S. A. ASDELL, Ph.D., Professor, Animal Husbandry
ROBERT C. BAKER, Ph.D., Professor, Poultry Husbandry
LEROY L. BARNES, Ph.D., Professor, Physics
RICHARD H. BARNES, Ph.D., Professor, Graduate School of Nutrition
ALICE M. BRIANT, Ph.D., Professor, Food and Nutrition
PAUL BUCK, Ph.D., Associate Professor, Dairy and Food Science
CYRIL L. COMAR, Ph.D., Professor, Physical Biology
LOUISE J. DANIEL, Ph.D., Professor, Biochemistry
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LEONARD A. MAYNARD, Ph.D., Professor Emeritus, Graduate School of Nutrition
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DONALD B. MCCORMICK, Ph.D., Assistant Professor, Graduate School of Nutrition
NELL MONDY, Ph.D., Associate Professor, Food and Nutrition
NORMAN S. MOORE, M.D., Professor, Clinical and Preventive Medicine
MARY A. MORRISON, Ph.D., Assistant Professor, Food and Nutrition

Savage Hall, the home of the Graduate School of Nutrition.

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CHARLOTTE M. YOUNG, Ph.D., Professor, Graduate School of Nutrition
ROBERT J. YOUNG, Ph.D., Associate Professor, Poultry Husbandry

THE GRADUATE SCHOOL OF NUTRITION

THE GRADUATE SCHOOL OF NUTRITION at Cornell coordinates the University's diverse research and training programs in food and nutrition. The resources of the entire University are used here to provide a special academic program leading to Masters' degrees in nutritional and food science.

The School prepares its graduates for a variety of careers in the fields of nutrition and food science. Many go into industrial or academic research. Others find positions in public health, teaching, the animal feed industry, and in food technology. Because of the surging interest in nutrition internationally, there is increased emphasis on training students for posts as nutritionists for the world-wide agencies WHO, FAO, and UNICEF.

The range and scope of the School's broad program is made possible by a unique faculty system. Most members hold joint appointments—in the Graduate School of Nutrition and in the school or college of primary affiliation. With this group and a core faculty employed primarily by the Graduate School of Nutrition, the School covers all aspects of nutrition under investigation at Cornell. In this way, nutritional science students may place major emphasis in human nutrition, nutritional biochemistry, clinical nutrition, experimental laboratory animal nutrition, large animal nutrition, or poultry nutrition. In the food science area, candidates may study with specialists in the individual fruit or vegetable crops and their processing; or in animal products such as milk, meat, poultry, and eggs; or in food chemistry.

With a faculty representing many fields, the student is assured academic guidance tailored to his individual needs. He is assigned a faculty adviser in whose special field his own interests lie. The adviser will plan an appropriate curriculum and direct the student's special research problem in either nutritional or food science, within the framework of courses basic to nutrition and required by the School.

An integrated academic program of research and teaching such as the one offered by the Graduate School of Nutrition is possible only through the cooperation of the contributing colleges at Cornell. The cooperative approach is seen also in the School's administration—a strong alliance including the President of the University, the Dean of the School, the Dean of the College of Agriculture, the Dean of the College of Home Economics, the Dean of the Veterinary College, the Dean of the Cornell Medical College, the Dean of the College of Arts and Sciences, the Dean of the College of Engineering, the Director of the Infirmary and Clinic, and the Provost of the University.

The partnership policy extends even to the area of finance. The State of New York, Cornell University, and a number of foundations and corporations all provide funds which support the School's activities.

CURRICULUM AND DEGREES

The Graduate School of Nutrition offers a curriculum providing for specialization in either nutritional science or food science. Its degrees of Master of Nutritional Science and Master of Food Science are awarded by the Cornell Graduate School.

The professional degrees, the Master of Nutritional Science and the Master of Food Science, are planned as terminal degrees awarded after satisfactory completion of a prescribed core of courses considered basic to an understanding of nutritional and food science at the Master's level, regardless of the field of special interest. In addition, specially chosen electives prepare each student for the field of his choice. The degrees represent a defined accomplishment in the area of nutritional science or food science.

The candidate for a degree prepares a report representing 6 to 10 semester hours credit based on his original research of a special problem. The special problem report is of thesis caliber.

The curriculum completed for the M.N.S. and M.F.S. degrees establishes an excellent background for advanced study. Students who have obtained these degrees frequently continue studies leading to the Ph.D. in such fields as biochemistry, food science and technology, animal nutrition, or food and nutrition.

ADMISSION

To be admitted to the School the applicant must hold a baccalaureate degree from a college or university of recognized standing or have done work equivalent to that required for such a degree. He must have a definite professional interest in the field of either nutritional science or food science. In order to qualify as a candidate for one of the graduate degrees, his training must include the completion, with a superior record, of courses in the following subjects, with the approximate number of semester hours as stated.

COURSE REQUIREMENTS

PHYSICAL SCIENCES—20 HOURS

Chemistry, physics, mathematics. Courses in quantitative chemistry and organic chemistry are prerequisites to courses required for graduation. If they are not offered for entrance, they must be taken following admission. Students who enter without college training in physics are required to take an elementary course in this subject before graduation. Credits for beginning courses in physics and chemistry, including organic and quantitative analysis, cannot be counted toward graduation.

BIOLOGICAL SCIENCES

Biology, botany, zoology, bacteriology, physiology.

For candidates for the M.N.S. degree—12 hours:

Courses in animal or human nutrition up to three hours may be counted in the biological sciences. Elementary courses in bacteriology or physiology cannot be counted toward graduation.

For candidates for the M.F.S. degree—8 hours:

Elementary courses in bacteriology cannot be counted toward graduation. However, an elementary course in bacteriology is prerequisite for advanced courses in bacteriology.

SOCIAL STUDIES—9 HOURS

Suggested subjects are economics, government, education, psychology, sociology, anthropology, and history.

OTHER COURSES

The applicant's record must show evidence that he has satisfactorily completed other courses prerequisite to those required by a candidate for a degree. An applicant who cannot meet in full the specific course requirements may be admitted if the faculty of the School so recommends, with the understanding that the deficiencies must be made up before graduation.

NONCANDIDATES

Admission as noncandidates is open to applicants who desire to register for a term or more to take specific courses but who do not wish to become candidates for a degree. Such applicants must hold Bachelors' degrees, must meet the other requirements specified for admission, and must show evidence that the courses desired will be of special benefit to them in their professional careers.

UNIVERSITY REQUIREMENTS

Applicants must meet the general requirements for admission to the Graduate School as set forth in the *Announcement of General Information* and the *Announcement of the Graduate School.*

HEALTH REQUIREMENTS

The following health requirements for entering graduate students have been adopted by the Cornell Board of Trustees. Failure to fulfill these requirements will result in loss of the privilege of registering the following term. The responsibility for fulfilling these requirements rests upon the student.

IMMUNIZATION

A satisfactory certificate of immunization against smallpox, on the form supplied by the University, must be submitted before registration. It will be accepted as satisfactory only if it certifies that within the last three years a successful vaccination has been performed. If this requirement cannot be fulfilled by the student's home physician, opportunity for immunization will be offered by the Cornell medical staff during the student's first semester, with the cost to be borne by the student. If a student has been absent from the

University for more than three years, immunity will be considered to have lapsed, and a certificate of revaccination must be submitted.

HEALTH HISTORY

Students accepted for admission will be required to submit health histories on forms supplied by the University.*

X-RAY

Every student is required to have a chest X-ray. He may (1) present a chest film, made by a private physician, on or before entering Cornell, provided that it was obtained within six months of initial registration and is of acceptable quality; *or* (2) he may present a chest X-ray report, provided that the radiograph was taken within the six months of initial registration, contains the film number and name and address of the X-ray facility, and is signed by a radiologist; *or* (3) he may have a chest X-ray at Cornell during the orientation period or at some other specified time shortly thereafter, in which case the charge will be included in the registration fee.*

REGISTRATION AND APPLICATIONS

All students admitted to the Graduate School of Nutrition must register through the Graduate School Office, 125 Day Hall, at the beginning of each term or session.

Applicants for admission should address their inquiries to the Office of the Graduate School, Cornell University, Ithaca, N. Y. No application will be acted upon until all credentials enumerated in the application form have been filed.

REQUIREMENTS FOR GRADUATION

The requirements for graduation call for the completion of at least two units of residence and the completion of at least 36 semester hours of specified and approved courses of which not more than 10 can be in research (Graduate School of Nutrition 199). In the event that certain required courses have been completed satisfactorily by the student prior to his admission to the Graduate School, substitutions will be made with the approval of his faculty adviser.

Certain elective courses may be required as deemed appropriate by the adviser and the faculty of the Gradaute School of Nutrition to round out the student's professional training in nutritional science or food science. The student must prepare a written report on an approved problem that may or may not require laboratory research, and must pass a final examination. The curriculum differs in accordance with the field in which the student wishes to specialize, as follows:

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* When a student who has been away from the University wishes to re-enter, he must, at his own expense, once more fulfill the chest X-ray requirement and also fill out a new health history.

NUTRITIONAL SCIENCE

The specialized training in this field, leading to the degree of Master of Nutritional Science, emphasizes the basic scientific knowledge and techniques of nutrition. The completion of the following curriculum is required:

	Hours		*Hours*
Biochemistry	6	History of Nutrition	1
Principles of Nutrition	3	Seminars	1
Laboratory work in nutrition	3	Advanced courses in human or animal nutrition	4
Advanced Physiology	6	Special problem	6 to 10
Food Economics	3		
Statistics	3		

In addition, the requirements include such approved electives as the faculty adviser and the faculty of the School may deem appropriate and necessary to round out the student's training in the field of nutritional science.

Faculty advising students for the M.N.S. degree include Professors S. A. Asdell, L. L. Barnes, R. H. Barnes, L. J. Daniel, R. W. Dougherty, C. L. Comar, J. F. Fryer, J. L. Gaylor, H. M. Hauck, R. W. Holley, D. E. Hogue, F. A. Johnston, M. R. Kare, L. P. Krook, F. L. Lengemann, J. K. Loosli, C. M. McCay, D. B. McCormick, N. S. Moore, M. A. Morrison, R. A. Nelson, W. L. Nelson, M. C. Nesheim, K. J. Newman, W. Pond, J. T. Reid, M. L. Scott, S. E. Smith, G. Steininger, K. L. Turk, R. G. Warner, R. H. Wasserman, H. H. Williams, L. D. Wright, C. M. Young, R. J. Young.

COURSES APPROVED FOR ADVANCED NUTRITION CREDIT

F.N. 324.	Nutrition	3 hours*
F.N. 330.	Diet Therapy	3 hours
F.N. 440.	Nutrition of Growth and Development	2 hours
F.N. 400. F.N. 401.	Readings in Nutrition	2 hours each
P.H. 210.	Advanced Poultry Nutrition	2 hours
C.P.M. 392.	Clinical and Public Health Nutrition	3 hours
C.P.M. 381. C.P.M. 382.	Field Observation and Experience in Community Nutrition	1 hour each
Bio. 150.	Biochemistry and Nutrition of the Vitamins	2 hours
Bio. 301.	Special Topics in Biochemistry	1 or 2 hours†

FOOD SCIENCE

The specialized training in this field, leading to the degree of Master of Food Science, emphasizes the sciences involved in food processing and utilization. The completion of the following curriculum is required:

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* If equivalent not previously taken.

† Depending on the topic.

	Hours		*Hours*
Biochemistry	6	Statistics	3
Advanced courses in bacteriology	6	Nutrition	3
Approved courses in food science	11	Seminars	1
		Special problem	6 to 10

In addition, the requirements include such approved electives as the faculty adviser and the faculty of the School may deem appropriate and necessary to round out the student's training in the field of food science.

Faculty advising students for the M.F.S. degree include Professors R. C. Baker, R. H. Barnes, P. A. Buck, A. A. Briant, R. K. Finn, D. B. Hand, J. D. Hartman, B. L. Herrington, E. E. Hester, G. J. Hucker, Z. I. Kertesz, F. A. Lee, K. Longree, L. R. Mattick, N. Mondy, J. C. Moyer, W. L. Nelson, C. S. Pederson, C. J. Personius, W. B. Robinson, H. W. Seeley, R. S. Shallenberger, O. Smith, R. M. Smock, J. P. VanBuren, G. A. Wellington, L. D. Wright.

COURSES APPROVED FOR FOOD SCIENCE

F.N. 314. Science in Food Preparation ..... 3 hours
F.N. 315. Science in Food Preparation; Introductory Experimental Cookery ..... 3 hours
F.N. 403. Special Problems for Graduate Students ..... *
F.N. 404. Readings in Foods ..... 2 hours
Food Sci. & Tech. 101. Principles of Food Technology ..... 3 hours
Eng. 5110. Elementary Chemical Engineering ..... 3 hours
D.&F.S. 102. Market Milk ..... 5 hours
D.&F.S. 111. Analytical Methods ..... 4 hours
D.&F.S. 113. Chemistry of Milk ..... 2 hours
D.&F.S. 103. Milk-Products Manufacturing ..... 5 hours
D.&F.S. 104. Milk-Products Manufacturing ..... 5 hours
D.&F.S. 108. Commercial Grades of Dairy Products ..... 1 hour
D.&F.S. 130. Dairy and Food Engineering ..... 4 or 5 hours
Pomology 111. Post-Harvest Physiology, Handling & Storage of Fruits ..... 3 hours
P.H. 150. Poultry Meat and Egg Technology ..... 3 hours
Veg. Crops 22. Potato Production and Processing ..... 3 hours
Veg. Crops 112. Handling Vegetable Crops, Advanced course ..... 4 hours
Bio. 140. Food Biochemistry ..... 3 hours
Bio. 150. Biochemistry and Nutrition of the Vitamins ..... 2 hours
Hotel Adm. 206. Meats, Poultry and Fish ..... 3 hours
Ag. Econ. 159. Food Economics ..... 3 hours
Ag. Econ. 250. Seminar in Food and Population ..... 2 hours
An. Hus. 90. Meat and Meat Products ..... 3 hours
An. Hus. 92. Meat and Meat Products ..... 2 hours

* Credits as arranged.

SPECIAL PROBLEM

The work involved in the report on an individual problem required for both degrees may be carried out with the approval of the student's faculty adviser under the direction of any member of the faculty of the School whom the student may choose and who is willing to supervise it. The report must be approved by the supervising faculty member and the original copy submitted to the Office of the Dean of the Graduate School of Nutrition at least one week prior to the beginning of the final examination period. Directions concerning the form in which the report is to be presented may be obtained either from the student's faculty adviser or from the Office of the Dean of the Graduate School of Nutrition.

EXAMINATION

A final examination, either oral or written or both, is required for either degree. Examinations are conducted by a committee consisting of the faculty adviser plus one other member to be designated by the faculty of the Graduate School of Nutrition or its delegated agent.

CREDIT FOR WORK DONE IN THE SUMMER

A student registered in the School may receive credit for work done in the University Summer Session if his program is approved in advance by his faculty adviser. To receive this credit he must also be registered in the Summer Session.

A student who has been registered in the School for one term after receiving his Bachelor's degree may, with the approval of his faculty adviser, register for a minimum of four and a maximum of twelve weeks for work in the summer on his individual problem under personal direction of a member of the faculty of the School and thus earn residence credit. The student can thus make use of the summer period to meet, in whole or in part, the requirements of six to ten hours granted upon the completion of his report on an approved problem.

RESIDENCE REQUIREMENTS

A student must complete at least two terms of residence after receiving the Bachelor's degree from Cornell or elsewhere to receive a degree from the School. A student who holds a teaching or research assistantship involving a significant loss of time from his course work will not be given full residence credit. Assistants whose duties call for approximately twenty hours of work weekly will receive three-fourths of residence credit a term. In other cases the amount of deduction will be determined by the General Committee of the Graduate School on recommendation of the faculty of the Graduate School of Nutrition.

TRAINING FOR SPECIALIZED FIELDS

FOOD SCIENCE

Growing emphasis on food—its availability, quality, processing, packaging, as well as its nutritive value—indicates a period of expanding opportunities for those trained in food science. The Graduate School of Nutrition offers programs for M.F.S. candidates which lead to careers in food production, research, quality control, technical sales, teaching, and government work.

Since all techniques for food processing and handling must be based on a thorough knowledge of food characteristics, the Graduate School of Nutrition prescribes an M.F.S. program emphasizing the sciences fundamental to the field, namely, chemistry, biochemistry, and bacteriology. The student who masters these sciences may easily learn the details of special food techniques on the job. His basic academic training therefore does not include specialized technology courses in food processing, packaging, and the like.

Work on the special problem may be carried on either at the Ithaca campus or at the New York State Agricultural Experiment Station at Geneva, New York. Staff members advise students and acquaint them with the several research projects under way, including studies of food spoilage, flavor, composition, preservation, fermentation, and irradiation effects.

NUTRITIONAL SCIENCE

Many fields are open to graduates with the M.N.S. degree. Research and teaching positions in universities and employment in commercial research laboratories are among the opportunities. Certain graduates are prepared for the field of public health nutrition. Foreign students receive a training useful in many teaching and governmental positions in their home countries.

The basic training for the M.N.S. degree emphasizes the physical and biological sciences and the principles of nutrition of all species. Through appropriate electives, students learn to apply these disciplines in either human or animal nutrition. Facilities for research include biochemical, microbiological, and physiological laboratories, experimental animal quarters, a diet table for experimental work in human nutrition, a metabolic unit in the Cornell Infirmary for the study of nutrition in relation to disease, and often, opportunity to participate in surveys.

Special opportunities are provided for students of appropriate background who are interested in preparing themselves for work as community nutritionists with health and welfare agencies. Here, the approved electives will include certain phases of social science, the elements of public health, clinical and public health nutrition, and appropriate informational service techniques. Opportunities for supervised experiences with community and health agencies are available for selected students. Students accepted for training in this area must plan financially for three to four weeks of residence away from Cornell to cover the field experience. Two weeks will be in the fall just prior to the

academic year; the third and possible fourth week may be either during the spring recess or immediately following final examinations. In addition, suitable students are urged to spend a two months' period in the summer in "in-service" training in nutrition as applied to the community and to public health. Help will be given in making the necessary contacts. These opportunities will provide assignments which can be used as the basis for meeting the requirement for a report on an individual problem.

Students with interest in the feed industry should have completed reasonably broad training in livestock production, including poultry, prior to admission. The training will stress principles of animal nutrition, animal physiology, experimental methods, and analytical procedures. To round out the training, courses in food economics, marketing, and business administration are provided.

TUITION AND FEES

A registration deposit of $28 must be made by every applicant accepted for admission unless the candidate has previously matriculated as a student at Cornell University. A check or money order payable to Cornell University should be remitted to the Graduate School, 125 Day Hall, upon notification of acceptance by the Graduate School of Nutrition. This deposit pays the matriculation fee, chest X-ray fee, and examination blank charge and covers certain expenses incident to graduation if the student receives a degree.

Limited refunds of tuition and fixed fees will be made to students who withdraw from the University prior to the completion of a term, for reasons accepted as satisfactory. For students who do not complete a term, tuition and other fees will be charged at the rate of 10 per cent for each week, or fraction of a week, from the first day of registration to the date of withdrawal as certified by the School; if, however, withdrawal is made within six days of the date of registration, no charge is assessed. The registration deposit will not be refunded.

The tuition for students registered in the Graduate School of Nutrition is $150 a term payable at the beginning of each term. Certain assistantships carry a waiver of tuition.

A College and University Fee of $112.50 a term payable at the beginning of each term is required of each registrant of the Graduate School of Nutrition whether he is receiving full residence credit or not. This general fee contributes toward the services supplied by the libraries, Clinic and Infirmary, and the student union in Willard Straight Hall, and pays a portion of the extra cost of laboratory courses and general administration.

Students of the Graduate School of Nutrition who attend classes in the Summer Session must register both in the Graduate School and in the Summer Session and pay the tuition and other fees required by the Summer Session.

Any tuition fee or other fee may be changed by the University Trustees to take effect at any time without previous notice.

GRADUATE ASSISTANTSHIPS, SCHOLARSHIPS, AND FELLOWSHIPS

GRADUATE ASSISTANTSHIPS

Graduate assistantships in the Graduate School of Nutrition are available. These assistantships are established to provide financial assistance to outstanding graduate students and at the same time to provide the Graduate School of Nutrition with qualified technical personnel to aid in the various research programs. The salary for an assistantship is at the rate of $1782 for nine months, with a waiver of tuition. The usual period runs from September 15 to June 15. With certain research projects this term may be extended to twelve months with appropriate salary adjustment.

Applications for graduate assistantships should be submitted directly to the Graduate School of Nutrition, Savage Hall, not later than March 1. Announcement of September appointments will be made on or about April 1.

Graduate assistantships for students in the Food Science program are available in many departments in addition to the Graduate School of Nutrition. Departments cooperating in the Food Science program are: Dairy and Food Science, Pomology, Vegetable Crops, Animal Husbandry, Poultry Husbandry, Food and Nutrition, and Food Science and Technology at the New York State Agricultural Experiment Station, Geneva. Applications for assistantships may be made by writing directly to any of the listed departments, or to the Secretary, Graduate School of Nutrition, Savage Hall, Ithaca, New York.

Residence credit for holders of these graduate assistantships is limited to three-fourths of a unit each term. The student must pay all fees required by the Graduate School.

SCHOLARSHIPS AND FELLOWSHIPS

A limited number of tuition scholarships and fellowships are available to graduate students. These include a number of national fellowships. Application should be made directly to the Office of the Graduate School, 125 Day Hall, Cornell University, not later than the February deadline (which varies from about the 10th to the 15th, depending on the year's schedule).

All prospective candidates for degrees in the Graduate School of Nutrition should consult the *Announcement of the Graduate School* for complete details on financial aid and scholarships.

PUBLIC HEALTH TRAINEESHIPS FOR PUBLIC HEALTH PERSONNEL

Students interested in preparing for positions as public health nutritionists may apply for public health traineeship awards from the Public Health Service. Applicants for such individual traineeships may secure application forms and additional information from any of the Regional Medical Directors of the United States Public Health Service or from the Chief, Division of General Health Services, Bureau of State Services, Public Health Service, U.S. Department of Health, Education and Welfare, Washington 25, D.C.

ADVISORY SERVICE FOR STUDENTS PREPARING AT CORNELL TO ENTER THE SCHOOL

Students in the Colleges of Agriculture, Arts and Sciences, or Home Economics at Cornell University, who prepare for admission to the Graduate School of Nutrition, may be advised during the period of preparation by members of the faculty of the School who are also members of the faculty of the college in which the students matriculate.

Undergraduates who are interested in nutrition and who are matriculating at Cornell University for the first time should state upon the application for admission that nutrition is the business or profession (field of work) which they expect to enter upon completion of their studies. This is necessary in order that appropriate faculty advisers may be assigned to them.

HEALTH SERVICES AND MEDICAL CARE

The health services and medical care of Cornell students are centered in the Gannett Medical Clinic (the out-patient department) and in the Cornell Infirmary (hospital). Students may consult a physician at the Clinic whenever need arises and receive treatment in cases that do not require hospitalization. If hospital care is indicated, the student is requested to enter the Infirmary. For details of the health and medical services covered by the student's College and University General Fee, see the *Announcement of General Information.* Insurance is available on a voluntary basis to supplement the services provided by the general fee; information about such insurance may be obtained at the Gannett Medical Clinic.

GRADUATE STUDENT HOUSING

University dormitory housing is available to single graduate students upon application to the Department of Residential Halls, 223 Day Hall. Married graduate students may apply to the Manager of Housing, Department of Residential Halls, for University-operated housing. Applications for all University housing should be made as soon as possible after January 1 for fall matriculants; after October 1 for spring matriculants. Detailed information concerning University housing may be obtained by writing to the Department of Residential Halls.

Rooms and apartments adjacent to the campus or in the downtown area are available in limited number. Students desiring off-campus housing should arrange to come to Ithaca well in advance of the term opening to arrange such accommodation. Inquiries may be directed to the Department of Residential Halls.

DESCRIPTION OF COURSES

THE FOLLOWING list of courses includes both those previously specified as required for the degrees offered and some of those from which electives may be selected, with the approval of the student's faculty adviser, in accordance with his specific field of interest.

The information in parentheses following the name and the course refers to the college in which the course is given, the department, and the course number. In registering for any of these courses the information shown in the parentheses should be given rather than the name of the course. In some instances the time and place are not given in the descriptive material enclosed in the parentheses following the title of the course. To obtain this information the student should consult the specific departmental office or the individual Announcements issued by the colleges concerned.

For courses marked with an asterisk (*), "advanced nutrition" credit may be given. For those marked with a dagger (†), "advanced food science" credit may be given.

NUTRITION

PRINCIPLES OF ANIMAL NUTRITION (Agriculture; Animal Husbandry 110). Fall. Credit three hours. For seniors and graduate students. Prerequisites, a course in human or veterinary physiology and a course in organic chemistry or biochemistry. Lectures, M W F 10. Wing C. Professor LOOSLI.

The chemistry and physiology of nutrition and the nutritive requirements for growth, reproduction, lactation, and other body functions.

LABORATORY WORK IN ANIMAL NUTRITION (Agriculture; Animal Husbandry 111). Fall or spring. Credit three hours. Prerequisites, Quantitative Analysis, Course 110 or its equivalent, and permission of the instructor. Class limited to 18 students each term. M W F 2–4:20. Stocking 160. Fall, Professor MCCAY and assistants. Spring, Associate Professor WARNER and assistants.

Each student engages in a series of short research projects with experimental animals, such as rats, dogs, and sheep. Both classical and modern techniques of animal experimentation are taught. The application of biochemical methods to the solution of animal nutrition problems is included.

NUTRITION (Home Economics; Food and Nutrition 324). Spring. Credit three hours. Prerequisites, elementary college courses in nutrition, biochemistry, and human physiology (for Home Economics students: Food and Nutrition 103, Human Physiology 303, or Zoology 201, and Biochemistry 101; other students should see the instructor about equivalent preparation). Discussion, T Th 8. Van Rensselaer 339. Laboratory, F 2–4 or M 2–4. Van Rensselaer 426. Professor HAUCK and Associate Professor NEWMAN.*

Principles of nutrition as they relate to energy metabolism and weight control, hygiene of the digestive tract, proteins, minerals, and vitamins. Application of the principles of nutrition to needs of normal individuals. During and as a result of this course the student is expected to establish and maintain good nutrition practices.

MATERNAL AND CHILD NUTRITION (Home Economics; Food and Nutrition 340). Fall or spring. Credit two hours. Prerequisite, Food and Nutrition 103 or 190. Not open to students who have taken Food and Nutrition 324. Majors in the department may elect this course as sophomores. Nonmajors must have junior or senior standing. Lecture and discussion,

W F 8. Van Rensselaer 339. Associate Professor NEWMAN.

Family nutrition with special emphasis upon the nutritional needs of the mother and child. Relation of nutrition to physical growth and development.

NUTRITION OF GROWTH (Home Economics; Food and Nutrition 440). Fall. Credit two hours. Prerequisite, Food and Nutrition 324 or equivalent. T Th 9. Van Rensselaer 301. Associate Professor NEWMAN.*

Relation of nutrition to growth and development from the prenatal period to adulthood. A study of research literature.

HISTORY OF NUTRITION (Agriculture; Animal Husbandry 215). Fall. Credit one hour. Th 4:15. Savage 130. Professor MCCAY.

The purpose of the course is to familiarize the student with the background literature in nutrition and to improve his technique in using the libraries. Each student prepares four written reports and summarizes these in brief oral reports to learn better ways to present technical information.

ADVANCED POULTRY NUTRITION (Agriculture; Poultry Husbandry 210). Spring. Credit two hours. For graduate students. Not given every year and not unless ten or more students apply for the course. Registration by appointment. Discussion and laboratory period, Th 2–4. Rice 201. Professor SCOTT.*

A study of one or more important fields of research in poultry nutrition, a critical consideration of the experimental methods used in conducting the investigations, and discussion of further studies needed, including the planning of the experiments.

READINGS IN NUTRITION (Home Economics; Food and Nutrition 400). Spring. Credit two hours. Prerequisite, Food and Nutrition 324 or equivalent. T Th 11. Van Rensselaer 301. Professor HAUCK. Offered only in even numbered years.*

Critical review of literature in the field of vitamin and mineral metabolism, with emphasis on the experimental data on which the principles of human nutrition are based.

READINGS IN NUTRITION (Home Economics; Food and Nutrition 401). Spring. Credit two hours. Prerequisite, Food and Nutrition 324 or equivalent. T Th 11. Van Rensselaer 301. Professor HAUCK. Offered only in odd numbered years.*

Critical review of literature relating to energy metabolism, proteins, fats, and carbohydrates, with emphasis on the experimental data on which the principles of human nutrition are based.

SEMINAR IN ANIMAL NUTRITION (Agriculture; Animal Husbandry 219). Fall. Credit one hour. Open to graduate students with major field of study in animal nutrition. Registration by permission. M 4:30. Animal Husbandry Building 348. Animal Nutrition staff.

A critical review of the literature and other topics of special interest to graduate students in animal nutrition.

NUTRITION SEMINAR (Agriculture; Biochemistry 292). Spring. Credit one hour. Registration by permission. M 4:15. Savage 100. Professor BARNES and staff.

Assignments and discussions of recent advances in the biochemistry and physiology of nutrition.

SEMINAR IN NUTRITION (Home Economics; Food and Nutrition 420). Fall. Credit one hour. T 4:30. Van Rensselaer 301. Department staff.

CLINICAL AND PUBLIC HEALTH NUTRITION (Clinical and Preventive Medicine 392). Spring. Credit three hours. Prerequisites, a course in nutrition, in physiology, and in biochemistry. Registration by permission of the instructor. For Graduate School of Nutrition and Graduate School students only. M W F 10. Savage 116. Professor YOUNG and members of the medical staff.*

This course is designed to familiarize the student with some of the applications of nutrition to clinical and public health problems.

FIELD OBSERVATION AND EXPERIENCE IN COMMUNITY NUTRITION (Clinical and Preventive Medicine 381–382). Throughout the year. Credit one hour (a term). Prerequisites (or in conjunction with), CPM 392 and Engineering 2509. Registration by permission only. For Graduate School of Nutrition and Graduate School students only. A two-week full-time field period just prior to the academic year and one to two weeks during the spring recess and/or immediately following final examinations in the spring term. Time and place as arranged. Visiting Assistant Professor ——— and Professor YOUNG.*

Supervised observation and experience in

community nutrition programs. Students must be prepared to defray expense of living costs in the communities selected for the field experience. Every effort will be made to keep costs minimal.

DIET THERAPY (Home Economics; Food and Nutrition 330). Fall. Credit three hours. Prerequisite, Food and Nutrition 324 or equivalent. Discussion, M W F 9. Van Rensselaer 426. Professor HAUCK.*
Modifications of the normal diet in consistency, energy value, source of calories, and various nutrients for the purpose of therapy. Experience in independent use of journal literature in this field.

NUTRITION AND HEALTH (Home Economics; Food and Nutrition 190). Fall. Credit two hours. Intended for students who have had no previous college course in human nutrition. Not to be elected by students who take Food and Nutrition 103 or 104. T Th 9. Van Rensselaer 426. Professor HAUCK.
The relationship of food to the maintenance of health; its importance to the individual and society.

PUBLIC HEALTH

PUBLIC HEALTH (Engineering 2509). Spring. Credit three hours. Professor GATES.
Lecture-discussions, reports, and field trips. An introduction to public health principles and practice, including the nature and activities of local, state, and national public health organizations. Environmental sanitation, emphasizing municipal and individual water supply and waste disposal methods; air and food sanitation; radiological health.

FOOD SCIENCE

PRINCIPLES OF FOOD TECHNOLOGY (Agriculture; Food Science and Technology 101). Throughout the year. Credit three or five hours a term. Prerequisites, Chemistry 106 and 303 or equivalent, Bacteriology 1, Physics 104. Lectures, T Th 10. Riley-Robb 225. Laboratory, Th 2–4:30. Riley-Robb 44. For those who register for 5 hours credit: prerequisite, a course in calculus, or analytical geometry and differential equations, and a course in biochemistry. Additional lecture and laboratory, T 2–5:30. Riley-Robb 44. Associate Professor BUCK.†
The fundamentals involved in the processing, production, and distribution of raw material to finished product, with emphasis on the unit operations and processes employed by the canning, freezing, fermentation, and dehydration industries. The fundamental and physical properties of foods, and their nutritive components, food additives and preservatives, and the principles of manufacture are discussed. Laboratory practice involves actual processing and preservation of various food products, and field trips.

FOOD BIOCHEMISTRY (Agriculture; Biochemistry 140). Spring. Credit three hours. Given in odd numbered years. Prerequisite, Biochemistry 101. Lectures, M W F 10. Savage 100. Associate Professor SHALLENBERGER and staff members from the Department of Food Science and Technology, New York State Agricultural Experiment Station, Geneva, New York.†
A discussion of some of the important nonmicrobial changes in foods, such as denaturation and the Maillard browning reaction. Emphasis is placed on the occurrence, significance, and prevention or control of the changes as they affect the color, odor, flavor, texture, or nutritive value of foods.

FOOD BIOCHEMISTRY SEMINAR (Agriculture; Biochemistry 294). Fall. Credit one hour. Registration by permission. F 4:30. Savage 130. Professor BARNES, Associate Professor SHALLENBERGER, and staff members from the Department of Food Science and Technology, New York State Agricultural Experiment Station, Geneva, New York.
Assignments and discussions of literature pertaining to the biochemical aspects of foods and food processing.

DAIRY AND FOOD ENGINEERING (Agriculture; Dairy and Food Science 130). Fall. Credit four hours. Prerequisites, Physics 103 and 104 or the equivalent, and Introductory Dairy Science 1 or Introductory Food Science 1. Lectures, M W F 10. Laboratory, M 2–4:30. Recitation to be

arranged. Stocking 119. Professor JORDAN.†
Engineering aspects of dairy and food-plant operations.

MEAT AND MEAT PRODUCTS (Animal Husbandry 90). Fall or spring. Credit three hours. Animal Husbandry 1 is recommended before registering for this course. Lecture, M 8. Animal Husbandry Building 82. Laboratory, M W or T Th 2–4:30. Animal Husbandry Building 63. Registration limited to sixteen students in each section. Assistant Professor STOUFFER.†
A course in livestock slaughtering, retail meat cutting, live animal and carcass relationships, and the storage, preservation, and processing of meat and meat products. A one-day field trip to packing plants will be taken.

MEAT AND MEAT PRODUCTS (Animal Husbandry 92). Fall or spring. Credit two hours. For women students. Not open to freshmen. Designed primarily for students in the College of Home Economics. Registration limited to sixteen students in each laboratory section. Lecture, Th 11. Animal Husbandry Building B-82. Laboratory, Th or F 2–4:20. Meat Laboratory. Professor WELLINGTON and the Poultry Department staff.†
The major phases of the study of meat and meat products, poultry and eggs; wholesale and retail buying; nutritive value of meats; and cutting, freezing, curing, cooking, and miscellaneous topics.

POULTRY MEAT AND EGG TECHNOLOGY. (Agriculture; Poultry Husbandry 150). Spring. Credit three hours. Given in alternate years. Prerequisites, Chemistry 303 or its equivalent and Bacteriology 1. Open to graduate students, juniors, and seniors. Lectures, M W 8. Rice 100. Laboratory, M 2–4. Rice 101. Professor BAKER.
Discussion and study of some of the important microbial and nonmicrobial changes in poultry meat and eggs as well as the chemical composition and preservation of these products. Development of new products is also emphasized.

ANALYTICAL METHODS (Agriculture; Dairy and Food Science 111). Spring. Credit four hours. Prerequisites, college physics and quantitative analysis. Lectures, T Th 11. Laboratory practice, T 1–5. Stocking 119. Professor HERRINGTON and assistant.†
A study of the more important operations and apparatus used in quantitative analysis, and their practical application.

CHEMISTRY OF MILK (Agriculture; Dairy and Food Science 113). Credit two hours. Prerequisites, qualitative and quantitative analysis and organic chemistry. Lectures, M W 9. Stocking 120. Professor HERRINGTON. Not given in 1961–1962.†
A critical review of the nature and properties of milk and milk constituents, and of the equilibria and reactions occurring in milk.

MARKET MILK (Agriculture; Dairy and Food Science 102). Spring. Credit five hours. Prerequisites, Introductory Dairy Science 1 and Bacteriology 1 or its equivalent. Professor HOLLAND, Associate Professor MARCH and assistants.†
The scientific, technical, and sanitary aspects of the fluid milk industry.

MILK-PRODUCTS MANUFACTURING (Agriculture; Dairy and Food Science 103). Fall. Credit five hours. Prerequisites, Introductory Dairy Science 1, Bacteriology 1, and organic chemistry or biochemistry. T Th 11–4:30. Stocking 120. Professor KOSIKOWSKI and assistant.† Offered only in odd numbered years.
The principles and practice of making butter, cheese, and casein, including a study of the physical, chemical, and biological factors involved. Consideration is given also to commercial operations and dairy-plant management.

MILK-PRODUCTS MANUFACTURING (Agriculture; Dairy and Food Science 104). Spring. Credit five hours. Prerequisite, Market Milk 102. T Th 11–4:30. Stocking 119. Professor JORDAN and assistant.†
The principles and practice of making condensed and evaporated milk, milk powders, ice cream, and by-products, including a study of the physical, chemical, and biological factors involved.

POSTHARVEST PHYSIOLOGY, HANDLING, AND STORAGE OF FRUITS (Agriculture; Pomology 111). Fall. Credit three hours. Prerequisite, Pomology 1 or 2. Lectures, T Th 8. Plant Science 143. Laboratory, Th or F 2–4:30. Plant Science 107. Professor SMOCK.†
The chemistry and physiology of fruits as they affect quality and marketability are studied. Handling methods, maturity indices, and storage practices are considered. Practical work involves grading and inspection of fruits and storage of fruit in different ways. One Saturday field trip is required.

POTATO PRODUCTION AND PROCESSING (Agriculture; Vegetable Crops 22). Spring. Credit three hours. Lectures, T Th 10. East Roberts 222. Laboratory, T or W 2–4:30. East Roberts 223. Professor SMITH.†

General principles and practical phases of potato production, storage, and processing are discussed. Growth processes and soil and environmental factors are emphasized as influencing production. Topics such as storage methods, grading, packaging, cooking quality, nutritive value, processing, and industrial uses of potatoes also are studied. Two field trips, one of which is all-day, are taken to potato farms and processing plants.

COMMERCIAL HANDLING AND MARKETING OF VEGETABLES, ADVANCED COURSE (Agriculture; Vegetable Crops 112). Fall. Credit four hours. Primarily for graduate students and those undergraduates who are specializing in marketing or food technology. Lectures, T Th 11. East Roberts 222. Laboratory, T or W 2–4:30. East Roberts 223. One-hour conference period, to be arranged. Professor HARTMAN.†

(Students registered for the Tuesday laboratory are scheduled to go on a field trip at 9:30 a.m. on the Wednesday when classes officially begin at noon.)

The handling of vegetables from harvest, whether for fresh market or processing, through the market channels to the consumer; personnel, facilities, machinery, and organization of the industry; quality measurement and grade standards; federal, state, and other regulations; principles and practices of precooling, storage, packaging, prepackaging, and other types of handling.

RESEARCH METHODS IN VEGETABLE CROPS (Agriculture; Vegetable Crops 225). Spring. Credit four hours. Primarily for graduate students. Prerequisite, Vegetable Crops 101. It is recommended that Botany 231 and 232 precede or accompany this course. Lectures, M W F 9. Laboratory, M 2–4:30. East Roberts 223. Professor KELLY.

A study of research techniques peculiar to vegetable crops, with a study of the literature and the solution of research problems.

VEGETABLE CROPS, ADVANCED COURSE (Agriculture; Vegetable Crops 101). Fall. Credit four hours. Prerequisites, Vegetable Crops 11 and Botany 31. Lectures, M W F 11. Laboratory, M 2–4:30. East Roberts 223. Professor KELLY.

Devoted to a systematic study of the literature dealing with practices in vegetable production. Results of experiments that have been conducted or are being conducted are studied, and their application to the solution of practical problems is discussed.

FOOD PREPARATION

SCIENCE IN FOOD PREPARATION (Home Economics; Food and Nutrition 314). Fall. Credit three hours. Prerequisites, Food and Nutrition 215 and Biochemistry 101 or equivalent. Lecture, W F 8. Van Rensselaer 121. Laboratory, S 9–11. Van Rensselaer 356 and 358. Professor PERSONIUS and Associate Professor HESTER.†

Scientific principles underlying modern theory and practice in the preparation of batters, doughs, and starch-thickened products, and in egg and milk cookery. The relation to food preparation of the physical and chemical properties of fats, proteins, starches, and leavening agents; colloidal systems—gels, sols, foams, and emulsions. Reading of original literature required. Laboratory studies of effect of varying ingredients, manipulation, and cooking conditions on quality of the product.

SCIENCE IN FOOD PREPARATION, INTRODUCTORY EXPERIMENTAL COOKERY (Home Economics; Food and Nutrition 315). Spring. Credit three hours. Prerequisite, Food and Nutrition 314, or equivalent. Lecture, T Th 9. Van Rensselaer 339. Laboratory, F 10–1. Van Rensselaer 358. Associate Professor HESTER.†

Continuation of Food and Nutrition 314 with emphasis on meat, fruit, and vegetable cookery, and frozen products. The relation to food preparation of the physical and chemical properties of sugars;

pigments, flavor constituents and structural components of meat; fruits and vegetables; the properties of true solutions, and principles of crystallization. Study of methods and techniques used in experimental work with food. Independent work on a problem in food preparation.

MEATS, POULTRY AND FISH (Hotel Administration 206). Fall and spring. Credit three hours. Associate Professor WANDERSTOCK.†
Deals with the major phases of meats, poultry, and fish from the hotel, restaurant, club, and institutional standpoint; nutritive value, structure and composition, sanitation, selection and purchasing, cutting, freezing, cooking, carving, and miscellaneous topics. Required three-day field trip to visit purveyors in New York City included. Estimated cost for this trip ranges between $30 and $40.

FOOD DEMONSTRATION (Home Economics; Food and Nutrition 305). Fall and spring. Credit two hours. Limited to 10 students. Prerequisite, Food and Nutrition 215. T Th 2:30–4. Van Rensselaer 352. Associate Professor SNOW.
Purposes and techniques of demonstrations in relation to food preparation and nutrition, with application to teaching, extension, business, and social service. Field trips to near-by areas may be planned—total cost to students not to exceed $3.00.

READINGS IN FOOD (Home Economics; Food and Nutrition 404). Fall. Credit two hours. Prerequisite, Food and Nutrition 315, or equivalent. T Th 11. Van Rensselaer 301. Associate Professor SNOW.†
Critical review of current literature. Emphasis on experimental data basic to the scientific principles underlying modern theory and practice in food preparation.

SEMINAR IN FOOD (Home Economics; Food and Nutrition 421). Spring. Credit one hour. T 4:30. Van Rensselaer 301. Department staff.

BACTERIOLOGY

DAIRY AND FOOD MICROBIOLOGY (Agriculture; Bacteriology 101). Spring. Credit four hours. Prerequisite, Bacteriology 1. Lectures, T Th 8. Stocking 119. Laboratory, T Th 9–12. Stocking 321. (In 1961–1962: Lectures, T Th 9. Stocking 119. Laboratory, T Th 10–1.) Professor NAYLOR and assistant.
A study of the microorganisms of importance in foods, with laboratory practice in the use of standard methods for microbiological testing and control of food products.

ADVANCED BACTERIOLOGY (Agriculture; Bacteriology 103). Spring. Credit six hours. Laboratory or lecture may be taken separately for reduced credit with permission of instructor. Prerequisites, Bacteriology 1 and organic chemistry. Lectures and laboratory practice, M W F 1:40–5. Stocking 119. Professor MACDONALD and assistants.
A study of the comparative physiological and ecological relationships among the bacteria. Such subjects as bacterial anatomy, cell growth, ecology, nutrition, and autotrophy are covered. Some of the more complex groups of bacteria such as the iron bacteria, the sulphur bacteria, the lactic acid bacteria, and the photosynthetic bacteria are studied in detail. Laboratory emphasis is on techniques for the isolation, cultivation, and rigorous study of these and other groups.

PHYSIOLOGY OF BACTERIA (Agriculture; Bacteriology 210). Fall. Credit two hours. Prerequisites, Bacteriology 1 and at least one additional course in bacteriology and one in organic chemistry. Lectures, T Th 10. Stocking 120. Professor DELWICHE.
The physiology of bacteria and the biochemistry of microbic processes.

MORPHOLOGY AND CYTOLOGY OF BACTERIA (Agriculture; Bacteriology 213). Fall. Credit three hours. For seniors and graduate students. Lectures, T Th S 9. Stocking 119. Professor KNAYSI.
The morphology, cytology, and microchemistry of microorganisms.

CHEMISTRY OF BACTERIAL PROCESSES (Agriculture; Bacteriology 215). Spring. Credit two hours. For seniors and graduate students. Lectures, M W 11. Stocking 119. Professor DELWICHE.
The chemistry of metabolism, fermentation, and nutrition of microorganisms.

BIOCHEMISTRY

ELEMENTS OF BIOCHEMISTRY, LECTURES (Agriculture; Biochemistry 101). Fall. Credit four hours. Prerequisite, organic chemistry, or Food and Nutrition 215. M T Th S 8. Savage 100. Professor DANIEL.

For undergraduate and graduate students. A basic course dealing with the chemistry of biological substances and their transformations in living organisms.

ELEMENTS OF BIOCHEMISTRY, LABORATORY (Agriculture; Biochemistry 102). Fall. Credit two hours. Prerequisite, quantitative analysis or Food and Nutrition 215, or by permission of the instructor. Must be taken with or after course 101. M W or T Th 2–4:20. Professor DANIEL, Associate Professor NEAL, and assistants.

Laboratory practice with biochemical substances and experiments designed to illustrate chemical reactions which may occur in biological systems.

FOOD BIOCHEMISTRY (Agriculture; Biochemistry 140). Spring. Credit three hours. Prerequisite, Biochemistry 101. Lectures, M W F 10. Savage 100. Associate Professor SHALLENBERGER and staff members from the Department of Food Science and Technology, New York State Agricultural Experiment Station, Geneva, New York.

A discussion of some of the important nonmicrobial changes in foods, such as denaturation and the Maillard browning reaction. Emphasis is placed on the occurrence, significance, and prevention or control of the changes as they affect the color, odor, flavor, texture, or nutritive value of foods.

BIOCHEMISTRY AND NUTRITION OF THE VITAMINS (Agriculture; Biochemistry 150). Spring. Credit two hours. Given in even-numbered years. Prerequisites, Chemistry 303 and 305, Biochemistry 101, or their equivalent. Primarily for graduate students. Lectures, T Th 10. Savage 100. Professor DANIEL.

The chemical, physiological, and nutritional aspects of the vitamins.

GENERAL BIOCHEMISTRY, LECTURES (Agriculture; Biochemistry 201–202). Throughout the year. Credit four hours per term. Prerequisites, quantitative analysis, Organic Chemistry 307 and 308 or the equivalent, and Physical Chemistry 403 and 404 or the equivalent. Physical Chemistry may be taken concurrently. Biochemistry 201 is prerequisite to Biochemistry 202. M W F S 9. Savage 100. Professors WILLIAMS, NELSON, WRIGHT, and GIBBS, and Associate Professors HOLLEY and HESS.

A systematic treatment of the principles of biochemistry. The discussion will emphasize comparative cellular chemistry, bioenergetics, the metabolism of carbohydrates, lipides, and nitrogenous compounds, and the factors involved in the regulation and control of metabolic pathways.

GENERAL BIOCHEMISTRY, LABORATORY (Agriculture; Biochemistry 203). Spring. Credit three hours. Prerequisites, to follow the satisfactory completion of Course 201 and to accompany or follow Course 202. *Registration by permission of instructor.* M W or T Th 2–5. Savage 230. Professors NELSON and GIBBS, and Associate Professor HESS.

Selected experiments dealing with enzymes, co-factors, and substrates of importance in metabolic processes. Practice is given in the use of special techniques employed in isolation, characterization, and mode of action of enzymes and enzyme systems. Emphasis is placed on the interpretation of data and written reports covering the various experiments.

BIOCHEMISTRY SEMINAR (Agriculture; Biochemistry 290). Fall and spring. Required of graduate students majoring in biochemistry and open to all who are interested. F 4:15. Savage 100. Staff.

Assignments and discussions of recent advances in biochemistry.

FOOD BIOCHEMISTRY SEMINAR (Agriculture; Biochemistry 294). Fall. Credit one hour. Registration by permission. T 4:30. Savage 130. Professor BARNES, Associate Professor SHALLENBERGER, and staff members from the Department of Food Science and Technology, New York State Agricultural Experiment Station, Geneva, New York.

Assignments and discussions of literature pertaining to the biochemical aspects of foods and food processing.

SPECIAL TOPICS IN BIOCHEMISTRY (Agriculture; Biochemistry 301). Fall or spring. Credit one or two hours. *Registration by permission of instructor.* Lectures, discussions, and assignments to original literature. T 9. Professor WILLIAMS and staff.

The special topic and the instructor will be announced each term prior to preregistration.

CHEMISTRY AND PHYSICS

CHEMISTRY OF NATURAL PRODUCTS (Arts and Sciences; Chemistry 395). Spring. Credit two hours. Prerequisites, Chemistry 320 and 365–366. Primarily for graduate students. Lectures, T Th 9. Mr. FARNUM.

Particular attention will be devoted to methods of structure determination as applied to selected terpenes, steroids, alkaloids, or antibiotics. Given in 1961–1962; offered only in alternate years.

INTRODUCTORY PHYSICAL CHEMISTRY (Arts and Sciences; Chemistry 403–404). Throughout the year. Credit three hours a term. Prerequisites, Chemistry 224 and 308; Mathematics 163, 183, or 193; and Physics 118. Chemistry 403 is prerequisite to Chemistry 404. Required of candidates for the degree of B.Ch.E. Lectures, M W F 9. Professor LONG.

A systematic treatment of the fundamental principles of physical chemistry. The laws of thermodynamics and of the kinetic theory are applied in a study of the properties of gases, liquids and solids, thermochemistry, properties of solutions, and equilibrium in homogeneous and heterogeneous systems. Chemical kinetics and atomic and molecular structure are also studied.

INTRODUCTORY PHYSICAL CHEMISTRY (Arts and Sciences; Chemistry 407–408). Throughout the year. Credit three hours a term. Prerequisites, Mathematics 163, 183, or 193; Physics 107 and 108; and Chemistry 215 or 224; or consent of the instructor. Chemistry 407 is prerequisite to Chemistry 408. Required of candidates for the degree of A.B. with a major in chemistry. Lectures, M W F 10. Professor HOARD.

Elementary principles and methods of physical chemistry and their applications to the chemical and physical properties of matter. Specific topics include gases, liquids, solids, molecular structure, the laws of thermodynamics, solutions, physical and chemical equilibria, chemical kinetics, and electrochemical systems.

INTRODUCTORY PHYSICAL LABORATORY (Arts and Sciences; Chemistry 411). Fall. Credit two hours. Prerequisite or parallel course, Chemistry 403 or 407. Enrollment may be limited. Required of candidates for the degrees of B.Ch.E. and A.B. with a major in chemistry. M T W or Th 1:40–4:30. Lecture, Th 12. Examinations, 7:30 p.m. Thursdays. Assistant Professor WUNDERLICH and assistants.

Aspects of physical chemical laboratory technique (error analysis, pressure-vacuum measurement and production, temperature and heat measurement, electrical instruments and their use) treated by selected quantitative experiments covering gas laws, phase diagrams, vapor pressure, calorimetry, and equilibrium.

PHYSICAL CHEMISTRY LABORATORY (Arts and Sciences; Chemistry 412). Spring. Credit two hours. Prerequisite, Chemistry 411. Enrollment will be limited. Required of candidates for the degrees of B.Ch.E. and A.B. with a major in chemistry. M T or W Th 1:40–4:30 or F 1:40–4:30, S 9–12. Assistant Professor WUNDERLICH and assistants.

Quantitative experiments in classical and modern physical chemistry.

PHYSICAL CHEMISTRY OF PROTEINS (Arts and Sciences; Chemistry 448). Spring. Credit three hours. Prerequisite, Chemistry 404 or 408. Primarily for graduate students. Lectures, M W F 8. Professor SCHERAGA.

Chemical constitution, molecular weight, and structural basis of proteins; thermodynamic, hydrodynamic, optical, and electrical properties; protein and enzyme reactions.

PHYSICS FOR STUDENTS OF BIOLOGY (Arts and Sciences; Physics 200). Either term. Credit three hours. Prerequisites, six semester hours of college work in each of the following: physics, chemistry, and biological science. Students having grades below 70 in either Physics 103 or

104 may not register for the course except by special permission of the instructor. Lectures, T Th 12. Laboratory, T or F 2–4. Professor BARNES.

Lectures and laboratory experiments dealing with selected topics in the properties of matter, electricity and magnetism, electromagnetic radiation, and nuclear physics that are related to the study of biology.

ECONOMICS

FOOD ECONOMICS (Agriculture; Agricultural Economics 159). Spring. Credit three hours. Designed especially for students in the Graduate School of Nutrition and in the College of Home Economics. Not open to students in the College of Agriculture except by permission of the instructor. Lectures and discussion, M W F 8. Savage 100. Professor DEGRAFF.†

Economic aspects of food, including production, distribution, and consumption, with special emphasis on the economics of diet.

MARKETING (Agriculture; Agricultural Economics 140). Fall or spring. Credit three hours. Lectures: fall, M W F 10; spring, M W F 11, except for weeks when field trips are taken, then M F lectures only. Warren 45. Field trips, T W or Th 1:30–5:30. Professor DARRAH.

A study of how farm products are marketed. Special attention is given to the consumption of farm products, the factors that affect consumption, production areas, market channels, the operation of different marketing agencies, marketing services, and costs. One all-day and five half-day trips are taken to visit marketing agencies.

SEMINAR IN FOOD AND POPULATION (Agriculture; Agricultural Economics 250). Spring. Credit two hours. Open only to graduate students. Registration by permission. W 7:30 p.m. Savage 130. Professor DEGRAFF.

Demographic behavior, population and food supply, comparative agriculture.

SURVEY OF INDUSTRIAL AND LABOR RELATIONS (Industrial and Labor Relations 293). Fall or spring. Credit three hours. Not open to ILR students.

A survey for students in other divisions of the University. An analysis of the major problems in industrial and labor relations; labor union history organization, and operation; labor market analysis and employment practices; industrial and labor legislation and social security; personnel management and human relations in industry; collective bargaining; mediation and arbitration; the rights and responsibilities of employers and employees; the major governmental agencies concerned with industrial and labor relations.

INSTITUTION ORGANIZATION AND ADMINISTRATION (Home Economics; Institution Management 425). Fall. Credit two hours. Graduate section of Institution Management 320. Instructor's signature required for preregistration. Lectures and discussions, M F 2. Van Rensselaer 124. One additional hour to be arranged. Professor BLOETJES.

Analysis and interpretation of major administrative problems in operating a food service organization. Application of business management, budgetary and production control principles to quantity meal preparation and service.

INDUSTRIAL ORGANIZATION AND MANAGEMENT (Mechanical Engineering 3235). Fall. Credit three hours a term. Three lectures a week.

Management of an industrial enterprise; internal organization; effect of type of product, methods of manufacture, size of enterprise, and personnel involved; types of enterprises; plant location; centralization and decentralization trends; diversification and specialization; growth of industry.

PERSONNEL MANAGEMENT (Mechanical Engineering 3232). Fall. Credit three hours. Three recitations a week. Intended for graduate students but open to qualified undergraduates. Prerequisite, Mechanical Engineering 3241 or permission.

Techniques of employee selection and evaluation, job evaluation, training, motivation; personnel department organization and interdepartmental relations.

MATHEMATICS

ANALYTIC GEOMETRY AND CALCULUS (Arts and Sciences; Mathematics 161). Either term. Credit three hours. Prerequisite, three years of college preparatory mathematics. Hours to be arranged.

Plane analytic geometry through conics. Differentiation and integration of polynomials with applications to rates, maxima, volumes, pressures, etc.

Courses 161–162–163 represent a standard three-term calculus sequence, presenting the main ideas and techniques of the calculus and analytic geometry; the material is so arranged that the first two terms (161–162) provide a reasonably complete introduction to the subject.

This sequence is not intended as preparatory to more advanced courses in mathematics, although admission to such courses can be obtained following this sequence by special permission. Students majoring in mathematics or in those physical sciences where mathematics is extensively used or who have special mathematical competence should elect the 161–182–183 sequence instead.

ANALYTIC GEOMETRY AND CALCULUS (Arts and Sciences; Mathematics 162). Either term. Credit three hours. Prerequisite, Mathematics 161. Fall term, hours to be arranged. Spring term: lectures, M W F 9 10 or 12, T Th S 9 10 or 12; one hour to be arranged.

Differentiation and integration of algebraic, trigonometric, logarithmic, and exponential functions, with applications. Related topics, including polar coordinates, parametric equations, and vectors.

ANALYTIC GEOMETRY AND CALCULUS (Arts and Sciences; Mathematics 163). Either term. Credit three hours. Prerequisite, Mathematics 162 or 182. Fall term: lectures, M W 10 or 12, T Th 10 or 12; one hour to be arranged. Spring term, hours to be arranged.

Infinite series, solid analytic geometry, partial derivatives, and multiple integrals.

STATISTICAL METHODS I.‡ (Agriculture; Plant Breeding 210). Fall. Credit one, three, or four hours. Prerequisite, graduate standing or permission of instructor. T Th S 10. Warren 245. Laboratory to be arranged. Associate Professor ROBSON.

The distributions of statistics encountered in biological and other fields are considered from the point of view of elementary probability notions and by sampling from known populations. The results, with principles of experimentation, are applied to the conduct of experiments and interpretation of results. The nature and validity of experimental error are treated. Topics include point and interval estimation, tests of hypotheses, the simpler experimental designs and their analyses of variance, linear regression and correlation, the treatment of discrete data.

STATISTICAL METHODS II.‡ (Agriculture; Plant Breeding 211). Spring. Credit one, three, or four hours. Prerequisite, Plant Breeding 210 or the equivalent. T Th S 10. Warren 245. Laboratory to be arranged. Associate Professor ROBSON.

The work of Plant Breeding 210 is continued. Topics include factorial experiments, individual degrees of freedom, analysis of covariance, analysis of variance of two-way classifications with disproportionate numbers, multiple and curvilinear regression, curve fitting, some recent developments in statistics.

ECONOMIC AND SOCIAL STATISTICS (Industrial and Labor Relations 510). Fall or spring. Credit three hours. T Th 2. Laboratory, F 3:30–5:30. Professor BLUMEN.

A nonmathematical course for graduate students in the social studies without previous training in statistical method. Emphasis will be placed on discussion of technical aspects of statistical analysis and on initiative in selecting and applying statistical methods to research problems. The subjects ordinarily covered will include analysis of frequency distributions, time series (including index numbers), regression and correlation analysis, and selected topics from the area of statistical inference.

PRINCIPLES OF INDUSTRIAL ACCOUNTING AND COST FINDING (Mechanical Engineering 3231). Fall and spring. Credit three hours. Two lectures and one computing period a week.

Basic course in the principles of industrial accounting including controlling accounts; special journals and ledgers; voucher system; manufacturing cost systems.

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‡ An additional hour per week is devoted to algebraic derivations and manipulations associated with the statistical techniques and computational procedures of the lectures and laboratory. The purpose is to give the student a better understanding of statistics and to improve his background for further work in statistics, such as Plant Breeding 213. This additional hour may be taken for one hour credit with or without the regular three hours credit.

PHYSIOLOGY AND HISTOLOGY

PHYSIOLOGY (Veterinary; Physiology 12). Spring. Credit three hours. Prerequisites, Physiology 11, Anatomy 1 and 2, or Anatomy 9 with permission. M W F 8. Professor SELLERS.

Lectures and demonstrations on blood and lymph, circulation, respiration, digestion, and absorption.

PHYSIOLOGY (Veterinary; Physiology 13). Fall. Credit three hours. Prerequisite, Physiology 12. M T W 9. Professors SELLERS, GANS, and DOUGHERTY.

EXPERIMENTAL PHYSIOLOGY (Veterinary; Physiology 14). Fall. Credit three hours. Prerequisites, Physiology 12, concurrent registration in Physiology 13. Limited registration. Laboratory, M 10–12:30, F 8–1; or W 10–12:30, S 8–1. Staff.

COMPARATIVE PHYSIOLOGY (Arts and Sciences; Zoology 451). Fall. Credit four hours. Prerequisites, one year of biology or zoology and college courses in chemistry. Organic chemistry is also desirable. Lectures, M W F 9. Laboratory, M T W Th F 1:40–4:50 or S 8:00–11:10. Professor ———.

The principal physiological functions of both vertebrates and invertebrates, including muscle contraction, nerve action, respiration, metabolism, digestion, circulation, excretion, endocrine action, and physiological regulation.

COMPARATIVE PHYSIOLOGY LECTURES (Arts and Sciences; Zoology 451 A). Fall. Credit three hours. Lectures, M W F 9. Professor ———. Prerequisites, one year of biology or zoology, and college courses in chemistry. Open only to students who are *not* majoring in zoology.

The lecture part of Zoology 451.

GENERAL AND CELLULAR PHYSIOLOGY (Arts and Sciences; Zoology 452). Spring. Credit four hours. Prerequisites, animal or plant physiology, organic chemistry, physics, and permission of the instructor. Biochemistry and histology, genetics or cytology, are also desirable. Enrollment is limited. Lectures, M W 12. Seminar and laboratory, T W or T Th 1:40–5. Professor ———.

An introduction to basic problems and methods of cellular physiology including physicochemical properties of protoplasm, function of cell organelles, role of nucleic acids, virus reproduction, permeability and active transport, growth, respiration, metabolism, and effects of ionizing radiation. The laboratory is designed to familiarize the student with basic techniques currently employed in physiological investigations, notably manometric and spectrophotometric methods, radioactive tracer technique, isolation of intracellular components, identification of enzyme systems, use of ultraviolet and x-irradiation, tissue culture, microsurgery, immunological methods.

GENERAL AND CELLULAR PHYSIOLOGY LECTURES (Arts and Sciences; Zoology 454). Spring. Credit three hours. Lecture, M W 12. Professor ———. Prerequisite, Organic Chemistry. Zoology 451 *or* Zoology 301 *or* Plant Physiology is also desirable. This course consists of the lecture part of Zoology 452.

EXPERIMENTAL ENDOCRINOLOGY (Arts and Sciences; Zoology 476). Spring. Credit two or three hours. Prerequisites, a year of zoology, organic chemistry, physiology, and consent of the instructor. Primarily for graduate students; open to undergraduates for two credits. Lectures, M F 11. Laboratory, M 2–4:30. Professor LEONARD.

Lectures on anatomy, physiology of the vertebrate endocrine glands, glandular interrelationships; chemical and physiological properties of hormones, assay methods. Laboratory, small-animal surgery and microtechnique for the endocrines, illustrative experiments on the effects of hormones.

FUNDAMENTALS OF ENDOCRINOLOGY (Agriculture; Animal Husbandry 127). Fall. Credit three hours. Lectures, T Th 10. Wing C. Laboratory to be arranged. Associate Professor HANSEL.

A general course in the physiology of the endocrine glands, and the roles played by each hormone in the regulation of normal body processes. The laboratory work is designed to illustrate the basic principles of endocrinology and their applications to more efficient production in all classes of livestock.

PHYSIOLOGY OF REPRODUCTION (Agriculture; Animal Husbandry 125). Spring. Credit two hours. Open to graduate students and upperclassmen. Prerequisite, a course in human or veterinary physiology. Lectures, M W 10. Wing C. Professor ASDELL.

An advanced course in reproduction, principally in mammals.

HISTOLOGY: THE BIOLOGY AND DEVELOPMENT OF THE TISSUES (Arts and Sciences; Zoology 301). Fall. Credit four hours. Prerequisites, Zoology 101–102, or 103–104, and 211–212. Lectures, T Th 11. Laboratory, T Th 8–10:30 or 2–4:30. Professor WIMSATT and assistants.

A survey of the structure, functions, and development of the tissues. The treatment is general, designed to provide students of biology with a basis for the understanding of normal and abnormal structure of the vertebrates. Each student will make for his own use a series of typical microscopic preparations.

SPECIAL HISTOLOGY: THE BIOLOGY OF THE ORGANS (Arts and Sciences; Zoology 302). Spring. Credit four hours. Prerequisite, Zoology 301. Enrollment limited to 25 students. Lectures, W F 9. Laboratory, W F 2–4:30. Professor WIMSATT and assistants.

A continuation of Zoology 301. Zoology 301 and 302 together give the fundamental facts of the microscopic structure, function, and development of the body. Opportunity to gain knowledge of technique in the fixing, embedding, and sectioning of selected organs is also offered.

SOCIAL STUDIES

THE SOCIOLOGY OF SOCIAL WORK (Agriculture; Rural Sociology 124). Fall. Credit three hours. Not open to freshmen or sophomores. Prerequisites, one course in sociology and one course in psychology. Lectures and discussions, M W F 9. Warren 260. Associate Professor TAIETZ.

A study of the structure and function of social work in the context of the dominant values in American society. The characteristics of the clientele, personnel, goals and problem-solving methods of social work are analyzed by means of pertinent sociological concepts and research.

PSYCHODYNAMICS OF PERSONALITY (Home Economics; Child Development and Family Relationships 360). Fall. Credit three hours. Prerequisite, Child Development 315 or Rural Education 111 or Psychology 103. Open to juniors and seniors; graduate students admitted by permission of the instructor. Limited to forty-five students. M W F 11. Van Rensselaer 124. Professor DALTON.

Psychological influences in the development and functioning of persons. Special attention will be given to basic determinants of personality; structure of the personality; personality in social and cultural context; the influence of conscious and unconscious processes in behavior.

RURAL COMMUNITY ORGANIZATION (Agriculture; Rural Sociology 111). Fall. Credit three hours. Prerequisite, Rural Sociology 1 or 12 or permission of the instructor. T Th 11–12:30. Warren 31. Associate Professor REEDER.

A consideration of the problems involved in helping people and organizations in a community work together to meet their common needs.

Problems which arise in helping schools, churches, farm organizations, and civic groups in integrating themselves into the life of the community are one part of this consideration. Students are given the opportunity to practice some organization techniques which have been found successful in community organization work.

ANTHROPOLOGY AND MODERN LIFE (Arts and Sciences; Sociology and Anthropology 116). Spring. Credit three hours. Prerequisite for underclassmen, Sociology and Anthropology 111; open to upperclassmen without prerequisite. Lectures, T Th 2, with discussion sections to be arranged. Professor HOLMBERG and staff.

The uses of anthropology in the modern world. Designed not only for students of the humanities and of different societies but also for natural scientists concerned with the cultural problems involved in technological change, community development, native administration, and modernization in various regions of the world. The analysis of case studies provides a basis for evaluating factors in changing situations in international, national, community, or smaller systems such as the factory, hospital, or other local institutions. Consideration is given to the organization of agencies of change, to the reactions of participants, and to the validity of general principles of human behavior and of ethics in planning or predicting cultural change.

THE NATURE OF MAN: CULTURE AND PERSONALITY (Arts and Sciences; Sociology and Anthropology 204). Spring. Credit three hours. Prerequisite, one of the following: Zoology 201 (or equivalent), a course in psychology (preferably Child Development and Family Relationships 115), sociology and anthropology, or child development and family relationships, or consent of the instructors. M W F 10. Professors LAMBERT and PELTO.

The study of the individual in his society, emphasizing the relationship between social structure, cultural context, and human behavior. Attention is given largely to the study of personality, "normal" and "abnormal," in non-Western societies.

This is one of three interdepartmental courses dealing with the nature of man from the perspectives of the biological and behavioral sciences. The other courses in the series are Zoology 201 and Child Development and Family Relationships 115. These courses may be taken singly or in any order.

NATIVE CULTURES OF NORTH AMERICA (Arts and Sciences; Sociology and Anthropology 233). Fall. Credit three hours. M W F 11. Professor SMITH.

A survey of representative American Indian cultures and the Eskimo, dealing with the economic, political, and social organization, the religion, and the arts of the more important groups; American Indian origins, prehistoric movements into the New World, subsequent cultural developments, and current problems of Indian administration in the United States.

NATIVE CULTURES OF SOUTH AMERICA (Arts and Sciences; Sociology and Anthropology 234). Spring. Credit three hours. M W F 11. Professor HOLMBERG.

CLASSIC CIVILIZATIONS OF MIDDLE AND SOUTH AMERICA (Arts and Sciences; Sociology and Anthropology 236). Spring. Credit three hours. M W F 11. Professor HOLMBERG. Alternates with Sociology and Anthropology 234.

A survey of the high civilizations of Mexico, Central America, and the Andean regions of South America. Attention will be focused on the formation, development, and achievements of such civilizations as the Inca, Chibcha, Maya, and Aztec.

NATIVE CULTURES OF SOUTHEAST ASIA (Arts and Sciences; Sociology and Anthropology 242). Spring. Credit three hours. M W F 2. Professor SHARP.

The development and distribution of major culture types in mainland and island Southeast Asia. Discussion of selected groups and of the fate of traditional cultural characteristics following the expansion of Chinese, Indian, Moslem, and Western civilizations in the area.

NATIVE CULTURES OF THE PACIFIC (Arts and Sciences; Sociology and Anthropology 245). Fall. Credit three hours. W 3–5. Professor SHARP. Offered in alternate years.

RESEARCH

SPECIAL PROBLEM (Graduate School of Nutrition 199). Report of individual problem under direction of any member of the faculty of the Graduate School of Nutrition. See page 7 for details.

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